



REMARKS

Claims 1 through 3, 6 through 20, 23 through 31, 34 through 37 and 39 through 41 are currently pending in the application.

No claims have been amended in this amendment.

Claims 8 through 11 have been canceled to eliminate redundancy. ~~NO~~

This amendment is in response to the Final Office Action of May 6, 2003.

Claims 1 through 3, 6 through 11, 16 through 20, 23 through 31, 34 through 37 and 41 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (U.S. Patent 5,643,831).

Claims 12 through 15, 39 and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (U.S. Patent 5,643,831) as applied to claims 1 through 3, 6 through 11, 16 through 20, 23 through 31, 34 through 37 and 41 above, and further in view of Bolstad (U.S. Patent 2,979,773).

Applicant submits that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure.

With regard to the rejection the rejection of claims 1 through 3, 6 through 20, 23 through 31, 34 through 37 and 41 under 35 U.S.C. § 103 as unpatentable over Ochiai in view of knowledge available to one skilled in the art, Applicant respectfully submits that such a rejection does not and cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103 because such a proposed combination of the cited prior art fails to meet the first two of the above criteria that the cited prior art suggests the modification of the reference or the combination of the reference and the combined cited prior art has a reasonable expectation of success.

First, with respect to claims 1, 18 and 29, there is no suggestion in Ochiai to combine the solder ball mold of Ochiai with variously-shaped cavities (trapezoidal hemispherical, rectangular and square) which, it is asserted, are known in the art. Additionally, the knowledge available to

one skilled in the art would not suggest the combination. In fact, the mold-forming process disclosed in Ochiai is not compatible with cavities that have trapezoidal, hemispherical, rectangular and square cross sections. The reason is that Ochiai etches a surface having a particular crystallographic orientation (the $\langle 110 \rangle$ plane) which is conducive to the etching of essentially identical wedge-shaped cavities if identical parallelogram-shaped areas of the surface are subjected to etching. Summary of the Invention at Col. 2, lines 62-67; Col. 3, lines 1-20. The wedge-shaped cavity and its associated volume are consequences of the crystallographic orientation of the surface, the parallelogram-shaped exposure areas, and the side dimensions of the parallelogram. Col. 6, lines 63-67; Col. 7, 1-20. The reference suggests or teaches only wedge-shaped cavities. It does not suggest or teach other shapes. Given the proclivity for the surface of Ochiai to form cavities of a specific shape upon exposure to etchants, as well as the relationship of the shape of the exposed surface to the shape of the cavity, it cannot be assumed that methods taught in Ochiai can be used to fabricate a mold with cavity cross sectional shapes different from the wedge-shape specifically taught by Ochiai. In fact, one skilled in the art would recognize that because of the crystallographic orientation of the surface used in Ochiai, the formation of cavity cross sections in shapes other than wedge-shaped would, in all likelihood, be difficult because the surface is in a crystal plane which affects the cavity shape. Thus, Ochiai teaches away from and does not suggest the proposed combination of cited prior art. It should be noted that Figures 14A-14C do not demonstrate cavities with hemispherical cross sections. They are in fact partially formed wedge-shaped cavities. Col. 7, lines 21-36. They have a basin-shaped profile, i.e., are longer than they are deep. The tendency of the surface to form wedge-shaped cavities prevents the cavities from attaining a hemispherical profile.

Accordingly, Ochiai in combination with the cited prior art cannot and does not *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention.

Second, there is little expectation of success. As set forth above, Ochiai, at best, suggests or teaches the etching of a specific crystallographic plane in order to obtain wedge shaped cavities. Because of the effect of the crystallographic orientation of the surface plane, the methods taught by Ochiai are at least uncertain, if not unlikely to easily produce other types of cross sections because of the tying of the cavity shape to one specific crystal plane orientation.

Accordingly, Ochiai in combination with any cited prior art does not and cannot *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention. Therefore, Applicant respectfully submits that claims 1, 18 and 29 are allowable for the reasons set forth above regarding the cited prior art failing to *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention, and 2, 3, 6, 7, 16, 17, 19, 20, 23 through 27, 29 through 31, 34 through 37 and 41 are allowable as depending from allowable claims.

With respect to the rejection of claims 12 through 15, 39 and 40 under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. as applied to claims 1 through 3, 6 through 11, 16 through 20, 23 through 31, 34 through 37 and 41 above, and further in view of Bolstad, Applicant respectfully submits that claims 12 through 15, 39 and 40 are allowable in light of the foregoing arguments pertaining to the applicability of Ochiai failing to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention.

Applicant submits that claims 1 through 3, 6, 7, 12 through 20, 23 through 31, 34 through 37 and 39 through 41 are clearly allowable over the cited prior art.

Applicant requests entry of the amendment for the following reasons:

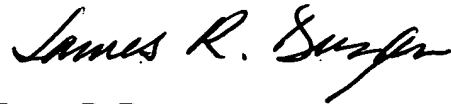
The amendment is timely filed.

The amendment clearly sets forth the basis for the allowance of the application.

The amendment does not require any further consideration because no claims were amended.

In summary, Applicant requests the entry of this amendment, the allowance of claims 1 through 3, 6, 7, 12 through 20, 23 through 31, 34 through 37 and 39 through 41, and the case passed for issue.

Respectfully submitted,



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Date: June 30, 2003
JRD/sls:djp
Document in ProLaw